Exercise 7.2

Page: 140

1:

Evaluate (i) 8! (ii) 4! – 3!

Solution:

(i) $8!=1\times2\times3\times4\times5\times6\times7\times8=40320$

(ii) $=1\times2\times3\times4=24$

$3!=1\times2\times3=6$

$\therefore 4!-3!=24-6=18$

2:

Is $4!+3!=7!$?

Solution:

$3!=1\times2\times3=6$

$=1\times2\times3\times4=24$

$\therefore 3!+4!=6+24=307!=1\times2\times3\times4\times5\times6\times7=5040$

$\therefore 3!+4!\neq7!$

3:

Compute $\frac{8!}{6!\times2!}$

Solution:

$$\frac{8!}{6!\times2!}=\frac{8\times7\times6!}{6!\times2\times1}=\frac{8\times7}{2}=28$$

4:

If $\frac{1}{6!}+\frac{1}{7!}=\frac{x}{8!}$, find x.

Solution:

$$\frac{1}{6!}+\frac{1}{7!}=\frac{x}{8!}$$

$$\Rightarrow\frac{1}{6!}+\frac{1}{7\times6!}=\frac{x}{8\times7\times6!}$$

$$\Rightarrow \frac{1}{6!}\left(1+\frac{1}{7}\right)=\frac{x}{8\times 7\times 6!}$$

$$\Rightarrow 1+\frac{1}{7}=\frac{x}{8\times 7}$$

$$\Rightarrow \frac{8}{7}=\frac{x}{8\times 7}$$

$$\Rightarrow x=\frac{8\times 8\times 7}{7}$$

$$\therefore x=64$$

5:

Evaluate $\frac{n!}{(n-r)!}$, when

(i) $n=6,\ r=2$ (ii) $n=9,\ r=5$

Solution:

(i) When $n=6,\ r=2$: $\frac{n!}{(n-r)!}=\frac{6!}{(6-2)!}=\frac{6!}{4!}=\frac{6\times 5\times 4!}{4!}=30$

(ii) When $n=9,\ r=5$: $\frac{n!}{(n-r)!}=\frac{9!}{(9-5)!}=\frac{9!}{4!}=\frac{9\times 8\times 7\times 6\times 5\times 4!}{4!}$

$$=9\times 8\times 7\times 6\times 5=15120$$